

REMARKS

Claims 1, 9 and 10 have been canceled. Claims 2-8 and 11-13 and new Claims 14-19 remain active in the case. Reconsideration is respectfully requested.

Specification Objections

The objections to the specification are believed obviated by the amendments to the specification. Withdrawal of the objections is respectfully requested.

Claim Amendments

Claim 1 has been canceled in favor of new Claim 14. Minor amendments have been made to Claims 2-8 and Claims 9 and 10 have been canceled and provide basis for new Claims 15 and 16 along with Claim 7. Claims 12 and 13 have been amended to improve upon the language of these claims. Support for new Claims 17 and 19 is found on page 4, lines 16-18 and on page 6, lines 23-26. New Claim 18 finds support in original Claims 1-4. Entry of the amendments and new claims is respectfully requested.

Claim Rejection, 35 USC 112

The amendments which have been made to the claims including the cancellation of Claim 1 in favor of new Claim 14 are believed to have obviated the issues that have been raised. Withdrawal of the rejection is respectfully requested.

Invention

As set forth in newly presented Claim 14, the present invention is directed to a method of inhibiting gas hydrates by contacting a gas hydrate with a graft copolymer. The substrates for

the graft polymer and the grafting monomers are defined in detail in new Claim 18.

Another aspect of the invention is a graft polymer comprised of a hydrophilic base polymer which is a polyalkylene glycol, a polyether or a polymer having at least one heteroatom in the main chain having a N-vinyl lactam grafted thereon. Polyphenylene ether, as a polyether, is excluded as a base polymer.

Prior Art Rejection

Claims 9-13 stand rejected based on 35 USC 102 as anticipated by WO 96/29501 the U.S. counterpart of which is U. S. Patent 6,251,836. This ground of rejection is respectfully traversed.

The WO '501 reference discloses a hydrate inhibitor composition that contains several additives, additive (i) being a hydrate inhibitor which is in the form of a polymer. As described in column 2, lines 32-34 of the '836 patent, the polymer is either a polymer product of the polymerization of monomers (a) and (b) or is a graft polymer in which monomer (b) is grafted onto homopolymer (a). From the description in the '836 patent, monomer (a) is an ethylenically unsaturated N-heterocyclic carbonyl compound of 6-8 ring atoms in the heterocyclic ring and monomer (b) is an ethylenically unsaturated N-heterocyclic carbonyl compound of 5-7 ring atoms in the heterocyclic ring. However, when it comes to a description of the types of graft polymers taught by the reference, only a graft polymer formed by grafting an olefin onto a polymer of an N-heterocyclic monomer is described (column 6, lines 54-58). This type of graft polymer is not within the scope of the graft polymer employed in the method aspect of the present invention, particularly as defined in new Claim 18, and is not within the scope of the graft polymer as claimed in new Claim 15. Applicants point out that in the claim to the graft polymer (original Claim 9, new Claim 15), one of the substrates for the graft polymer product is a polymer having at least one heteroatom in the main chain. Such a substrate condition is not

fulfilled by a polymer formed from the ethylenically unsaturated N-heterocyclic carbonyl compound, because polymerization of this type of monomer occurs through the ethylenically unsaturated group which is the vinyl group. Polymerization of this group only produces a polymer backbone which contains carbon, not nitrogen. In present Claim 15, on the other hand, polymer substrates that contain nitrogen in the main chains are such as a polyurethane or a polyalkyleneimine as set forth in new Claim 16. These polymer substrates are not taught or suggested in the patent. Of course, amended Claim 13, which depends on Claim 15, is limited to hydrate inhibitors in which the polymer of the substrate component does not include the graft substrates taught in the patent. Accordingly, the cited WO '501 patent does not anticipate any aspect of the invention and withdrawal of the rejection is respectfully requested.

Claims 9-13 stand rejected based on 35 USC 102 as anticipated by Sloan, U. S. Patent 5,432,292. This ground of rejection is respectfully traversed.

The Sloan patent, although disclosing a material that prevents clathrate hydrate formation, nevertheless, only shows a water absorbing material that is a poly(N-vinyl lactam) homopolymer or copolymer or, in a preferred embodiment, is a combination of the poly(N-vinyl lactam) homopolymer or copolymer and hydroxyethylcellulose (column 5, lines 47 et seq and column 7, lines 40-44). No graft polymer is shown or suggested by the reference and therefore the reference does not anticipate the invention as claimed in any of its embodiments and withdrawal of the rejection is respectfully requested. ✓

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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